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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,348	11/18/2003	J.S. Lewis	42P17609	8687

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EXAMINER

JOHNSON, JONATHAN J

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/717,348

Applicant(s)

LEWIS ET AL.

Examiner

Jonathan Johnson

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 16-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 16-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claim 27 limitation that "the thermally conductive material is applied to part of the structural layer not overlapped by the first component" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 7, 16-19, and 26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,462,285 (Enroth). Enroth teaches applying thermally conductive material to a first side of a structural layer, the structural layer having a connection pad on the first side of the structural layer (figure 8, item 32), a via extending from the first side to a second side of the structural layer (figure 8, item 33), and a conductive trace between the via and the connection pad on the first side of the layer (figure 8, item 38), the thermally conductive material being applied to be in contact with at least one of the via and the conductive trace (figure 8, item 70); connecting a first component to the connection pad (figure 8, item 56); and heating a second side of the structural layer after connecting the first component to the connection pad (figure 8, item 60); connection pad comprises a ball grid array pad; and the first component is connected to the ball grid array pad with solder (figure 8, item 56); applying solder paste to the ball grid array pad before applying the thermally conductive material to the first side of a structural layer (figure 8, item 56); wherein heating the second side of the structural layer comprises at least part of a wave solder process that connects a second component to the structural layer (figure 8, item 60 and 84); wherein the thermally conductive material is not removed from the structural layer (col. 5, ll. 25-46); connecting a first component to the connection pad with a first connection material having a melting point (figure 8, item 56); and connecting, after connecting the first component,

Art Unit: 1725

a second component to a second side of the layer after connecting the first component to the connection pad (figure 8, item 56), wherein the second component is connected to the second side with a second connection material raised to a temperature at least as high as the melting point of the first connection material (col. 5, ll. 25-46) where the connection pad is one of a plurality of pads and the trace is one of a plurality of traces where the thermally conductive material is applied to be in contact with multiple traces (figure 2, item 10); where the thermally conductive material is applied to part of the structural layer not overlapped by the first component (figure 8, item 70).

Claims 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,462,285 (Enroth). Enroth teaches applying thermally conductive material to a first side of a structural layer, the structural layer having a connection pad on the first side of the structural layer (figure 8, item 32), a via extending from the first side to a second side of the structural layer (figure 8, item 33), and a conductive trace between the via and the connection pad on the first side of the layer (figure 8, item 38), the thermally conductive material being applied to be in contact with at least one of the via and the conductive trace (figure 8, item 56, where the solder is in electrical contact with the trace and via); connecting a first component to the connection pad (figure 8, item 76); and heating a second side of the structural layer after connecting the first component to the connection pad (figure 8, item 60); where part of the thermally conductive material is located between the first side of the layer and the first component (figure 8, item 56), where the thermally conductive material is applied to be in contact with both the first side and the first

Art Unit: 1725

component (figure 8, item 56), where the thermally conductive material is not directly contacting the via (figure 8, item 56).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 6 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,462,285 (Enroth) as applied to claim 1 above and further in view of US 6,815,817 (Akram). Akram teaches the use of a thermal epoxy using a syringe (col. 4, ll. 25-35 and figure 6, item 34). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the plug of Enroth to utilize the thermal epoxy in order to help transfer heat from the flip chip (see Akram col. 4, ll. 20-50). It is the examiner's position that since the combined invention of Enroth and Akram uses substantially the same material as applicants, the particular thermal conductivity would necessarily be present. When the examiner has reason to believe that functional language asserted to be critical for establishing novelty in claimed subject matter may, in fact be an present in the prior art, the burden of proof is shifted to the applicant to prove that the subject matter shown in the prior art does not possess the characteristics relied upon. *In re Fitzgerald et al.* 205 USPQ 594.

Art Unit: 1725

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,462,285 (Enroth) as applied to claim 16 above and further in view of US 6,815,817 (Akram). Akram teaches the use of a thermal epoxy using a syringe (col. 4, ll. 25-35 and figure 6, item 34). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the plug of Enroth to utilize the thermal epoxy in order to help transfer heat from the flip chip (see Akram col. 4, ll. 20-50).

Response to Arguments

Applicants argue Enroth teaches applying the plug to the opposite side on which the connection pad and trace are located. The examiner agrees. Applicant goes on to argue that Enroth fails to disclose the claim 1 limitation "applying thermal conductive material to a first side of a structural layer." The examiner disagrees. During patent examination, the pending claims must be "given the broadest reasonable interpretation." Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). In the instant case, the examiner interprets the "first side" as the top layer shown in figure 8, item 12 and the via shown as figure 3, item 33. The examiner notes that applicant does not describe the substrate as the top or bottom but rather uses the more general terms of first and second sides of a substrate.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., applying a

Art Unit: 1725

thermally conductive material directly on the top of a structural layer) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

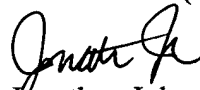
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Johnson whose telephone number is 571-272-1177. The examiner can normally be reached on M-Th 7AM-5:30 PM.

Art Unit: 1725

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 571-272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Johnson
Primary Examiner
Art Unit 1725